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S

B

PRODUCT NUMBER | US $

α-BORON ANALOGS OF GLYCINE AND DERIVATIVES
Isoelectronic and isosteric boron analogs of α-amino acids and their derivatives (peptides, amides) have exhibited hypolipidemic, anti-inflammatory, and anti-cancer activities in *in vivo* studies.
Ref.: Sood, A., et al., Eur. J. Med. Chem., 25, 301 (1990).

Borobetaine
See: Trimethylamine—Boranecarboxylic Acid *Page 977*
Borobetaine Methyl Ester
See: Trimethylamine—Boranecarboxylic Acid Methyl Ester *Page 977*
Borobetaine-Met Methyl Ester
See: N-(Trimethylamine—Boranecarbonyl)-methionine Methyl Ester *Page 977*
Borobetaine-Pro Methyl Ester
See: N-(Trimethylamine—Boranecarbonyl)-proline Methyl Ester *Page 977*
Boro-N,N-dimethylglycine
See: Dimethylamine—Boranecarboxylic Acid *Page 356*
Boro-N,N-dimethylglycine Ethylamide
See: Dimethylamine—Boranecarboxylic Acid N-Ethylamide *Page 356*
Boroglycine
See: Ammonia—Boranecarboxylic Acid *Page 105*
Boroglycine Ethylamide
See: Ammonia—N-Ethylcarbamoylborane *Page 105*
Borosarcosine
See: Methylamine—Boranecarboxylic Acid *Page 649*
Borosarcosine Ethylamide
See: Methylamine—Boranecarboxylic Acid N-Ethylamide *Page 649*
Boro-prefixed names are trademarks of Boron Biologicals, Inc.

BORON ATOMIC ABSORPTION STANDARD SOLUTION (pfs) — B 8016 — 100 ml 11.80; 500 ml 30.25
1,000 µg B per ml (nominal) in H_2O, actual value given on label. FOB Sigma

BORONIC ACID-AGAROSE
See: m-Aminophenylboronic Acid-Agarose under Affinity Chromatography Media *Page 1643*

BORON NITRIDE (pfs) — B 4402 — 50 g 36.40; 250 g 141.60
[10043-11-5] BN FW 24.82

BORON TRICHLORIDE (pfs) — B 6636 — 100 ml 27.20 FOB Sigma
1 M solution in hexane
[10294-34-5] BCl_3 FW 117.2

BORON TRICHLORIDE-METHANOL
10% boron trichloride in methanol for preparing methyl esters of fatty acids and for transesterification of triglycerides.
[10294-34-5]

B 0877 — Sealed ampules. Shelf life is extended considerably in sealed ampules. — 5 ml 12.80; 10 ml 17.35; 25 ml 26.95 FOB Sigma

B 1002 — Bottle with screw-cap closure. — 100 ml 24.40; 500 ml 61.90 FOB Sigma

BORON TRIFLUORIDE ETHERATE
d = 1.15 g/ml
[109-63-7] $C_4H_{10}BF_3O$ FW 141.9

B 6261 — Brown liquid (pfs) — 100 ml 13.90; 250 ml 18.45; 1 liter 36.75 FOB Sigma

B 8764 — Redistilled (pfs) Light yellow liquid. — 100 ml 25.10; 800 ml 67.00 FOB Sigma

BORON TRIFLUORIDE-METHANOL
14% boron trifluoride in methanol is useful for preparing methyl esters of fatty acids and for transesterification of triglycerides.
[373-57-9]

B 1127 — 14% solution in sealed ampule. Shelf life is extended considerably in sealed ampules. — 5 ml 11.85; 10 ml 16.20; 25 ml 21.70; 10 × 5 ml 77.60 FOB Sigma

B 1252 — 14% solution in bottle with screw-cap closure. — 5 ml 9.35; 100 ml 9.65; 250 ml 17.55; 500 ml 29.75; 1 liter 53.40 FOB Sigma

B 2388 — 50% solution in bottle with screw-cap closure (pfs) Useful in esterification of aromatic acids. **Ref.:** Hallas, G., J. Chem. Soc., 5770 (1965). — 5 ml 10.65; 50 ml 18.40; 100 ml 33.20; 250 ml 57.50; 500 ml 89.40 FOB Sigma

BOTROCETIN
See: Venoms, Snake, from Bothrops jararaca *Page 1012*

BOTULINUM TOXIN A (pfs) — B 8776 — 10 µg 25.00; 100 µg 82.35 FOB Sigma
From Clostridium botulinum Solution in 0.2 M NaCl, 0.05 M sodium acetate, pH 6.0.
Not assayed by Sigma.
WARNING:
EXTREMELY HAZARDOUS!
Safety data sheet accompanies this product. Additional safety data sheets available on request. Be sure you are aware of the hazardous nature of this item.
[93384-43-1]

BOTULINUM TOXIN B (pfs) — B 6403 — 10 µg 25.00; 100 µg 73.50 FOB Sigma
From Clostridium botulinum Solution in 0.05 M acetate, 0.2 M sodium chloride, pH 6.0.
Not assayed by Sigma.
WARNING:
EXTREMELY HAZARDOUS!
Safety data sheet accompanies this product. Additional safety data sheets available on request. Be sure you are aware of the hazardous nature of this item.
[93384-44-2]

BOTULINUM TOXIN C (pfs) — B 9027 — 10 µg 26.50; 100 µg 119.50 FOB Sigma
From Clostridium botulinum Solution in 0.05 M phosphate buffer, pH 6.0.
Not assayed by Sigma.
[93384-45-3]

PRODUCT NUMBER

BOTULINUM TOXIN D (pfs)
B 1397 — **From Clostridium botulinum Solution in 0.2 M sodium chloride, 0.05 M sodium acet pH 6.0**
Not assayed by Sigma.
WARNING:
EXTREMELY HAZARDOUS!
Safety data sheet accompanie tional safety data sheets avail sure you are aware of the haz item.
[93384-46-4]

BOTULINUM TOXIN E (pfs)
B 6528 — **From Clostridium botulinum Solution in 0.05 M acetate, 0.2 M sodium chloride, pH 6.**
Not assayed by Sigma.
WARNING:
EXTREMELY HAZARDOUS!
Safety data sheet accompanie tional safety data sheets avai sure you are aware of the ha item.
[93384-47-5]

BOTULINUM TOXIN F (pfs)
B 9152 — **From Clostridium botulinum Solution in 0.05 M acetate bu fer, 0.2 M NaCl, pH 6.0.**
Not assayed by Sigma.
[107231-15-2]

BOUIN'S SOLUTION
See Diagnostic Kits and Reagents

BOVINE ADRENAL MEDULLA P
See: Bioactive Peptides *Page*

BOVINE IgG
See: Immunochemicals *Page*

BOVINE PROTEINS, Antisera to
See: Immunochemicals *Page*

BOVINE ALBUMIN
See: Albumin, Bovine *Page 6*

BOVINE EMBRYONIC FLUID
See: Tissue Culture Media ar

BOVINE SERUM ALBUMIN
See: Albumin, Bovine *Page 6*
See also: Molecular Biology I

BOWMAN-BIRK INHIBITOR
See: Trypsin-Chymotrypsin I

BPOC-GLY-GLY-HIS-PHE HYDRAZIDE (pfs)
B 8393 — (Biphenylisopropyloxycarbo Gly-Gly-His-Phe-$NHNH_2$)
[115035-44-4] $C_{35}H_{48}N_8O_6$ FW

BPST CHLORIDE
See: 2-(2'-Benzothiazolyl)-5-3-(4'-phthalhydrazidyl)tetra
Page 147

BRADYKININ
See: Bioactive Peptides *Pag*

Lys-[Ala³]-BRADYKININ
See: Bioactive Peptides *Pag*

BRADYKININ POTENTIATOR I
See: Bioactive Peptides *Pag*

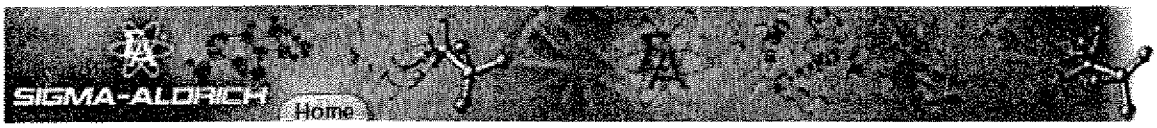
BRADYKININ POTENTIATOR I
See: Bioactive Peptides *Pag*

Bulk quanti

PRODUCT NUMBER		US $
	◆ BOTULINUM TOXIN D (pfs)	10 µg 33.70
B 1397	**From Clostridium botulinum**	100 µg 187.00
	Solution in 0.2 M sodium chloride, 0.05 M sodium acetate, pH 6.0	FOB Sigma
	Not assayed by Sigma.	
	WARNING:	
	EXTREMELY HAZARDOUS!	
	Safety data sheet accompanies this product. Additional safety data sheets available on request. Be sure you are aware of the hazardous nature of this item.	
	[93384-46-4]	
	◆ BOTULINUM TOXIN E (pfs)	10 µg 31.75
B 6528	**From Clostridium botulinum**	100 µg 176.40
	Solution in 0.05 M acetate, 0.2 M sodium chloride, pH 6.0.	FOB Sigma
	Not assayed by Sigma.	
	WARNING:	
	EXTREMELY HAZARDOUS!	
	Safety data sheet accompanies this product. Additional safety data sheets available on request. Be sure you are aware of the hazardous nature of this item.	
	[93384-47-5]	
	◆ BOTULINUM TOXIN F (pfs)	10 µg 36.80
B 9152	**From Clostridium botulinum**	100 µg 204.45
	Solution in 0.05 M acetate buffer, 0.2 M NaCl, pH 6.0.	FOB Sigma
	Not assayed by Sigma.	
	[107231-15-2]	
	BOUIN'S SOLUTION	
	See Diagnostic Kits and Reagents Section.	
	BOVINE ADRENAL MEDULLA PEPTIDES	
	See: Bioactive Peptides *Page 1066*	
	BOVINE IgG	
	See: Immunochemicals *Page 1260*	
	BOVINE PROTEINS, Antisera to	
	See: Immunochemicals *Page 1190*	
	BOVINE ALBUMIN	
	See: Albumin, Bovine *Page 63*	
	BOVINE EMBRYONIC FLUID	
	See: Tissue Culture Media and Reagents *Page 1414*	
	BOVINE SERUM ALBUMIN	
	See: Albumin, Bovine *Page 63* *See also:* Molecular Biology Products *Page 1354*	
	BOWMAN-BIRK INHIBITOR	
	See: Trypsin-Chymotrypsin Inhibitor *Page 992*	
	BPOC-GLY-GLY-HIS-PHE	25 mg 24.85
B 8393	**HYDRAZIDE (pfs)**	50 mg 41.35
	(Biphenylisopropyloxycarbonyl-Gly-Gly-His-Phe-$NHNH_2$)	100 mg 68.85
	[115035-44-4] $C_{35}H_{40}N_8O_6$ FW 668.8	
	BPST CHLORIDE	
	See: 2-(2'-Benzothiazolyl)-5-styryl-3-(4'-phthalhydrazidyl)tetrazolium Chloride *Page 147*	
	BRADYKININ	
	See: Bioactive Peptides *Page 1039*	
	Lys-[Ala^3]-BRADYKININ	
	See: Bioactive Peptides *Page 1040*	
	BRADYKININ POTENTIATOR B	
	See: Bioactive Peptides *Page 1041*	
	BRADYKININ POTENTIATOR C	
	See: Bioactive Peptides *Page 1041*	

PRODUCT NUMBER		US $
	BRAIN ACETONE POWDER	
	Prepared with acetone only.	
B 0508	**Bovine**	5 g 10.40
		10 g 18.20
		25 g 39.05
		100 g 125.10
B 4132	**Cat**	1 g 32.35
B 7881	**Dog**	1 g 26.35
		5 g 84.65
B 9261	**Goat**	1 g 5.35
		10 g 24.60
B 4507	**Guinea Pig**	1 g 32.55
B 9136	**Mouse**	100 mg 10.40
		250 mg 20.15
		1 g 54.25
B 9882	**Pigeon**	1 g 7.95
		5 g 24.30
B 6503	**Porcine**	1 g 6.45
	See also: NADase, Product No. N 9879 for a butanol-washed acetone-dried powder.	5 g 14.00
		10 g 22.75
B 2881	**Rabbit**	1 g 5.80
		5 g 16.80
		10 g 27.15
		25 g 52.95
B 4257	**Rat**	250 mg 12.10
		1 g 32.15
B 9137	**Rattlesnake**	1 mg 7.75
	(Crotalus adamanteus)	5 mg 22.40
		25 mg 71.20
B 9006	**Sheep**	1 g 5.80
		10 g 26.35
B 0758	**Turtle**	10 mg 7.10
		25 mg 13.15
		100 mg 34.70
	BRAIN EXTRACT	
B 1502	**Type I: Folch Fraction I**	25 mg 6.05
	From Bovine Brain	100 mg 11.80
	Sealed ampule.	1 g 57.35
	Contains 10-20% phosphatidylinositides, 50-60% phosphatidylserine as well as several other brain lipids.	
	Ref.: Folch, J., J. Biol. Chem., **146**, 35 (1942).	
B 1627	**Type III: Folch Fraction III**	100 mg 11.45
	From Bovine Brain	250 mg 22.15
	Sealed ampule.	500 mg 36.40
	Contains 80-85% phosphatidylserine; balance primarily other brain lipids.	1 g 60.10
	Ref.: Folch, J., J. Biol. Chem., **146**, 35 (1942).	
B 1752	**Type V: Folch Fraction V**	25 mg 5.35
	From Bovine Brain	100 mg 10.60
	Sealed ampule.	1 g 54.65
	Contains a minimum of 40% phosphatidylethanolamine; balance primarily other brain lipids.	
	Ref.: Folch, J., J. Biol. Chem., **146**, 35 (1942).	
B 1877	**Type VI: From Bovine Brain**	100 mg 7.10
	Sealed ampule.	500 mg 21.65
	A hot methanol extract of whole bovine brain precipitated by cooling.	1 g 35.40
		10 g 188.85
	Contains several phospholipids and glycolipids including gangliosides.	

(Continued)



SIGMA-ALDRICH

SpecificationSheet

Product Name	Botulinum Toxin A from *Clostridium botulinum*, lyophilized powder
Product Number	B8776
Product Brand	Sigma
CAS Number	93384-43-1
Storage Temp	−20°C

TEST	**SPECIFICATION**
APPEARANCE	LYOPHILIZED POWDER
PURITY BY SDS-PAGE	SINGLE MAJOR BAND WITH A MOLECULAR WEIGHT OF APPROX. 150 KDA

LIST BIOLOGICAL LABORATORIES, INC.

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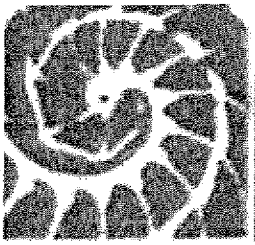

We are the world leader in producing bacterial toxins over 25 years for research including cholera, pertussis, tetanus, diphtheria, pasteurella multocida, shiga-like and botulinum toxins. Toxin subunits, recombinant PA, LF, and EF from Bacillus anthracis, toxoids, antisera and LPS are also available. Check our catalog for a complete list of products. If you have an interest in a particular toxin not mentioned, please contact us directly. We do manufacturing contract and solicit customers' ideas for new products.

APPLICATIONS	BACTERIAL TOXINS	ANTISERA, ANTIBODIES, and PEPTIDE SUBSTRATES
CTIN CYTOSKELETON EGULATORS	Anthrax Toxins from *Bacillus anthracis*	SNAPtide®(U.S Patent # 6,504,006), a peptide substrate for botulinum toxin type A
DJUVANTS AND ARRIERS	Botulinum Toxins from *C. botulinum*	MAPKKide® Peptide Substrate (o-Abz/Dnp) for Lethal Factor
POPTOSIS	Cholera Toxins from *V. cholerae*	VAMPtide® Peptide Substrate (oAbz/Dnp) for C. botulinum type B
RET SUBSTRATES	Difficile Toxins from *C. difficile*	SNAP Etide™ Peptide Substrate (o-Abz/Dnp) for C. botulinum type E
OXOIDS	Tetanolysin from *C. tetani*	SNAP-25 Recombinant Protein Substrate for *C. botulinum* Type A and E neurotoxin
MMUNE RESPONSE ODULATORS	Neurominidase from *Vibrio cholerae*	Goat Anti-Exotoxin A Antibody for Exotoxin A from *P. aeruginosa*
EMBRANE TRAFFIC _TERERS	Diphtheria Toxins and CRM_{197} from *C. diphtheriae*	Goat Anti-Choleragenoid Antibody for Cholera Toxin B Subunit
ETALLOPROTEASE IHIBITORS	Pertussis Toxins from *B. pertussis*	Goat Anti-Toxin A Antibody for Toxin A from *Clostridium difficile*
EURONAL MARKERS	Shiga Like Toxins from *E. coli*	Anti-Shiga Like Toxin 1 and 2 (Mouse IgG1-κ) Monoclonal
ORE FORMERS	Tetanus Toxins from *C. tetani*	Goat Anti-PA, Anti-LF, and Anti-EF from *Bacillius anthracis*
ROTEIN SYNTHESIS IHIBITORS	Alpha toxin from *S. aureus*	Anti-Adenylate Cyclase Toxin Murine Monoclonal Antibody 3D1

ECEPTORS	Enterotoxin type B from *S. aureus*	Anti-RTX Murine Monoclonal Antibody 9D4
CREENING FOR OTULINUM TOXIN HIBITORS	Pasteurella Multocida Toxin	**RECOMBINANT PROTEINS and MORE TOXINS**
GNAL TRANSDUCTION	Exotoxin A from *P. aeruginosa*	Botulinum Neurotoxin Light Chain Type A, B, C, D, E and F NEW
JPERANTIGENS	Adenylate Cyclase Toxin from *B. pertussis*	Tetanus Toxin Light Chain
POPOLYSACCHARIDES		FHA

osters:

ternally Quenched Fluorogenic Substrates for Anthrax Lethal Factor. N. Shine, L. Eaton, K. Crawford resented at the 5th International Conference on Anthrax, March 30, 2003 in Nice, France

apid, Sensitive and Specific Assay to Measure the Endoprotease Activity of Botulinum Toxin Type N. Shine, T. Christian, L. Eaton, K. Crawford - presented at the 5th International Conference on Basic and herapeutic Aspects of Botulinum and Tetanus Toxins, June 2005 in Denver, Colorado, USA.

omparison of Activity of Botulinum Neurotoxin Type A Holotoxin and Light Chain Using NAPtide™ FRET Substrates. T. Christian, N. Shine, L. Eaton, K. Crawford - presented at the 5th ternational Conference on Basic and Therapeutic Aspects of Botulinum and Tetanus Toxins, June 2005 in enver, Colorado, USA.

ensitive and Specific Assay to Measure Endoprotease Activity of Botulinum Toxin Type A olotoxin in Milk. Nancy Shine, Linda Eaton, and Karen Crawford presented at the 42nd Annual IBRCC, ecember 5-8, 2005 in Baltimore, Maryland.

hysical Characteristics of rLF and rPA: Effects on Enzymatic Activity and Binding. Nancy Shine, ndy Le, Linda Eaton, and Karen Crawford presented at Bacillus Act 2005, September 25-29, 2005 in anta Fe, New Mexico.

o request one of these posters, please send email to Dr. Shine

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LIST BIOLOGICAL LABORATORIES, INC.

BOTULINUM NEUROTOXINS

Clostridium botulinum neurotoxins (BoNTs) block the release of acetylcholine from peripheral cholinergic nerve endings[1] and cause botulism in man and animals.[2,3] Seven immunologically distinct serotypes of neurotoxin, designated types A through G, have been identified.[4] Each is synthesized as a single polypeptide chain (M_R 150,000).[5] When botulinum neurotoxin is exposed to proteases, either during cultivation of the *Clostridium botulinum* organism or subsequent to purification of the toxin, specific peptide bonds are cleaved or "nicked" resulting in the formation of a dichain molecule.[4,6] Dichain neurotoxin is composed of a light chain region (M_R 50,000) linked by disulfide bonds and non-covalent interactions to a heavy chain (M_R 100,000).[7] Conversion of the single chain form of a neurotoxin to its dichain form generally results in increased toxicity.[7] When the light and heavy chains of botulinum toxin are separated from one another, neither is capable of blocking neurotransmitter release in unaltered cells. However, the light chain alone is capable of blocking acetylchyoline release if injected directly into the cell cytosol.[8,9]

Botulinum neurotoxins resemble other toxins such as ricin, exotoxin A, diphtheria, cholera and tetanus toxins. Each of the toxins contain a region that is responsible for binding and navigation[1], and a second region which has enzymatic activity.[10] In the case of clostridial neurotoxins, these regions are represented by the heavy and light chains, respectively.[10] Blockage of acetylcholine release from nerve endings by botulinum toxin proceeds through a multi-step process that includes binding, receptor-mediated internalization, translocation across a membrane, reduction and proteolysis of substrates.[11,12,13]

All types of botulinum toxin are zinc-dependent proteases. Enzymatic activity resides exclusively in the light chain of the molecules. These enzymes cleave SNARE proteins, synaptobrevin 2, syntaxin and SNAP 25, which form the core of a complex involved in the fusion of transmitter-containing vesicles with the plasma membrane.[10] Prior to fusion, the SNARE proteins in the vesicle and plasma membrane interact forming a complex which contracts with an increase in the intracellular calcium concentration, pulling the vesicle close to the plasma membrane. Interaction between lipids in the two membranes allow the vesicle and nerve terminal active zone to fuse.[14,15] During this fusion, the contents of the vesicles, mainly neurotransmitters, are released, and the inner surface of the vesicles is exposed to the synaptic cleft. If one of the SNARE proteins is cleaved by a neurotoxin, complex formation cannot occur and fusion is interrupted. Botulinum toxins of type B, D, F and G cleave synaptobrevin 2 (M_R 19,000) which is located in vesicular membranes.[10] Syntaxin (M_R 36,000) and SNAP 25 (M_R 25,000) are attached to the inner surface of the plasma membrane in nerve endings close to the active zone. Syntaxin is cleaved by botulinum toxin type A and SNAP 25 by botulinum toxins type A, C1, E. [16,17,18]

Toxins must pass through the plasma membrane of nerve cells to gain access to their intracellular targets. A thirty-four amino acid sequence on the C-terminal of both botulinum toxins type A and type B binds to specific types of gangliosides with a low affinity.[1] In addition, a motif within the C-terminal half of the heavy chain is thought to bind to a

protein, representing the high affinity binding site.[10] In the case of BoNT/B, synaptotagmin, a protein spanning the vesicular membrane, was shown to function as the receptor.[19] Physiologically this protein regulates fusion through an interaction with calcium.[20,21] The N-terminal part of this protein projects into the lumen of the vesicle and is exposed to the synaptic cleft only when exocytosis occurs. Presentation of the binding protein allows the toxin to attach to the membrane. Following endocytosis the synaptotagmin-bound toxin molecules are trapped in vesicles that then pass through the endosomal compartment, where the contents are acidified by an ATP-driven proton carrier.[22] The N-terminal half of the heavy chain may undergo conformational changes at low pH allowing its insertion into and penetration through the endosomal membrane.[22] As neurotoxin enters the cytosol, the disulfide link between light and heavy chains is reduced by enzymes.[9,7] At this point, light chains are active and able to cleave SNARE proteins which are not complexed. This multi-step process is similar to the intoxication with tetanus toxin, another closely related clostridial neurotoxin. [1,24]

Membrane fusion is a highly conserved process, occurring in all secretory cells.[18,25,26,27] Light chains of clostridial neurotoxins are capable of blocking secretion if they gain access to their substrates in non-neuronal cells. To poison cells lacking receptors for the uptake, neurotoxins or their light chains may be artifically introduced. When these toxins are introduced in secretory cells, secretion stops. Cell types from various origins have been shown to exhibit a toxin-sensitive fusion apparatus.[9,28,29]
Botulinum neurotoxins are valuable research tools in studies aimed at elucidating the mechanisms involved in vesicle trafficking, and in gaining an understanding of the underlying events of synaptic transmission.[30,31] Botulinum neurotoxins are the most deadly bacterial toxins known. Their ability to cause cessation of neurotransmitter release at the neuromuscular junction and autonomic nerve endings can lead to disturbances as well as to fatal paralysis. Ironically, it is this property of botulinum toxin which has been successfully harnessed and used clinically to treat certain neuromuscular disorders in humans, such as blepharospasm, strabismus and torticollis.[3]

List Biological Laboratories, Inc., provides highly purified preparations of botulinum neurotoxins from *Clostridium botulinum* types A and B. In addition, purified heavy chains and toxoids derived from each of these toxins are also available. Furthermore, recombinantly produced light chains from both types A, B, C, D and E have developed. These light chains are non-toxic proteins that retain the enzymatic activity encoded by the holotoxin. They lack any binding domain and are unable to gain access to intracellular targets without microinjection. Light chain from type A is capable of cleavage of the eukaryotic substrate SNAP 25 and is also highly active with the quenched fluorogenic peptide substrate, SNAPtide™, that has been developed by List. The light chains from type B and D are capable of cleavage of the eukaryotic substrate synaptobrevin 2, and the light chain from type C in capable of cleavage of the substrate Syntaxin 1A. Contact List for current information on available fluorogenic peptides.

These products are intended for research purposes only and are not intended for use in humans. For further information, please contact List Biological laboratories, Inc.

See a Typical Certificate of Analysis for product #: 130A, 130B, 610, 620, 625, 630, 635, 133, 136, 139, 520, 521, 528, or 529.
See a Material Safety Data Sheet for product #: 130, 610, 132, 133, 136, 138, 139.

References

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MATERIAL SAFETY DATA SHEET
#130 and #9130 Botulinum Neurotoxin A

Hazardous Ingredients:

Neurotoxin type A from *Clostridium botulinum* is a 150,000 dalton protein and is one of the most potent toxins known. This formulation also includes 1.25% lactose.

Physical Properties:

This product is provided as a white lyophilized powder. It is soluble in distilled water.

Fire and Explosion Hazard Data:

Neurotoxin type A is combustible but not flammable. Use dry chemical, halon, carbon dioxide, polymer foam or water fire extinguisher. Wear self-contained breathing apparatus and full protective clothing.

Health Hazard:

The LD_{50} in humans is estimated at 1 ng/kg (Gill, D.M. (1982) *Microbiol. Rev.* **46,** 86-94). It is a very potent neurotoxin which may be fatal if inhaled, ingested, injected, or introduced into a wound. The incubation period is usually 4 hours to 8 days. Symptoms include muscle weakness especially in the face and neck early on, then the upper extremities, and finally the lower extremities, fatigue, dizziness, incoordination, an extremely dry mouth, blurred vision, sensitivity to bright lights, difficulty swallowing, drooling, difficulty speaking clearly, slurring, difficulty breathing, nausea, abdominal bloating, constipation, and difficulty urinating. There are no mentation nor sensory abnormalities and no fever.

If contact occurs, flush the eyes, skin, mouth (if conscious), or wounds thoroughly with water. For ingestion, dilute with water and induce vomiting. Seek medical attention, since supportive therapy will be required if symptoms occur. Immune serum, available from the U.S. Public Health Service, Centers for Disease Control, at 404-639-3311 days or 404-639-2888 after hours, may also be a part of the medical treatment.

Reactivity Data:

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TYPICAL CERTIFICATE OF ANALYSIS
#130A Botulinum Neurotoxin A

Contents:

Each 10 μg vial of botulinum toxin type A, when reconstituted with 100 μl of appropriate buffer, contains 1.25% lactose. To insure maximum recovery, reconstitution liquid must contain 1.0 mg/ml BSA. When the toxin is used for *in vitro* studies, it is preincubated in a buffer containing 5 mM dithiothreitol for 30 minutes in order to reduce and thereby activate the toxin. For use with SNAPtide^{R}, Product # 520 and #521, see the corresponding Certificate of Analysis for the appropriate buffer.

Concentration:

Protein concentration was determined by absorbance at 280 nm using an extinction coefficient of 1.63[1] for a 1 mg/ml solution.

Gel Electrophoresis:

When examined on 7.5% SDS-polyacrylamide gels prepared according to the method of Wyckoff,[2] a modification of the Laemmli[3] gel system, this protein migrates as a single major band with an apparent molecular weight of approximately 150,000 daltons. In the presence of a reducing agent, the preparation migrates as two bands with apparent molecular weights of 100,000 and 50,000 daltons.

Storage:

This product is supplied as a lyophilized powder which has been stoppered under vacuum. Store at 4°C prior to and following reconstitution. Freezing is not recommended unless the product is stored aliquoted in the presence of 0.1% albumin.

Toxicity:

Botulinum toxin is the most deadly bacterial toxin known to man. The lethal dose in unvaccinated humans is estimated at 1 ng/kg.[4] Consult the MSDS for further information.